Articulating conservation outcomes for Citizen Science: Emerging principles and practices for the 21st century

Tina Phillips, Cornell Lab of Ornithology
Evaluation Program Manager
tina.phillips@cornell.edu

NOAA Brown Bag Seminar
Washington D.C., January 29, 2014

birds.cornell.edu

A membership institution interpreting and conserving the earth's biological diversity through research, education, and citizen science focused on birds

Goal for this

1) To broaden our view of "conservation outcomes" within citizen science
2) Illustrate exemplar citizen science projects influencing conservation
3) Describe ways to improve our conservation efforts

Citizen Science

Members of the public and professional scientists engaged in collaborative research to generate new science-based knowledge

Also Known As ...

participatory action research

Community-based monitoring

community science

civic science

volunteer monitoring

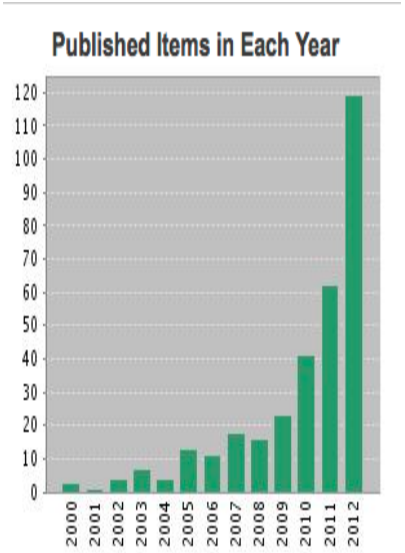
local and traditional knowledge

public participation in scientific research

Current State of Citizen

Growing interest in citizen science

- International conferences
- Special issues in leading journals
- 1200+ papers using CS data
- White House Champions of Change



Growing need for measuring/ documenting the impacts of PPSR

- Scientific outcomes – check
- Education outcomes – in progress
- Conservation…?

→ **Evaluation**

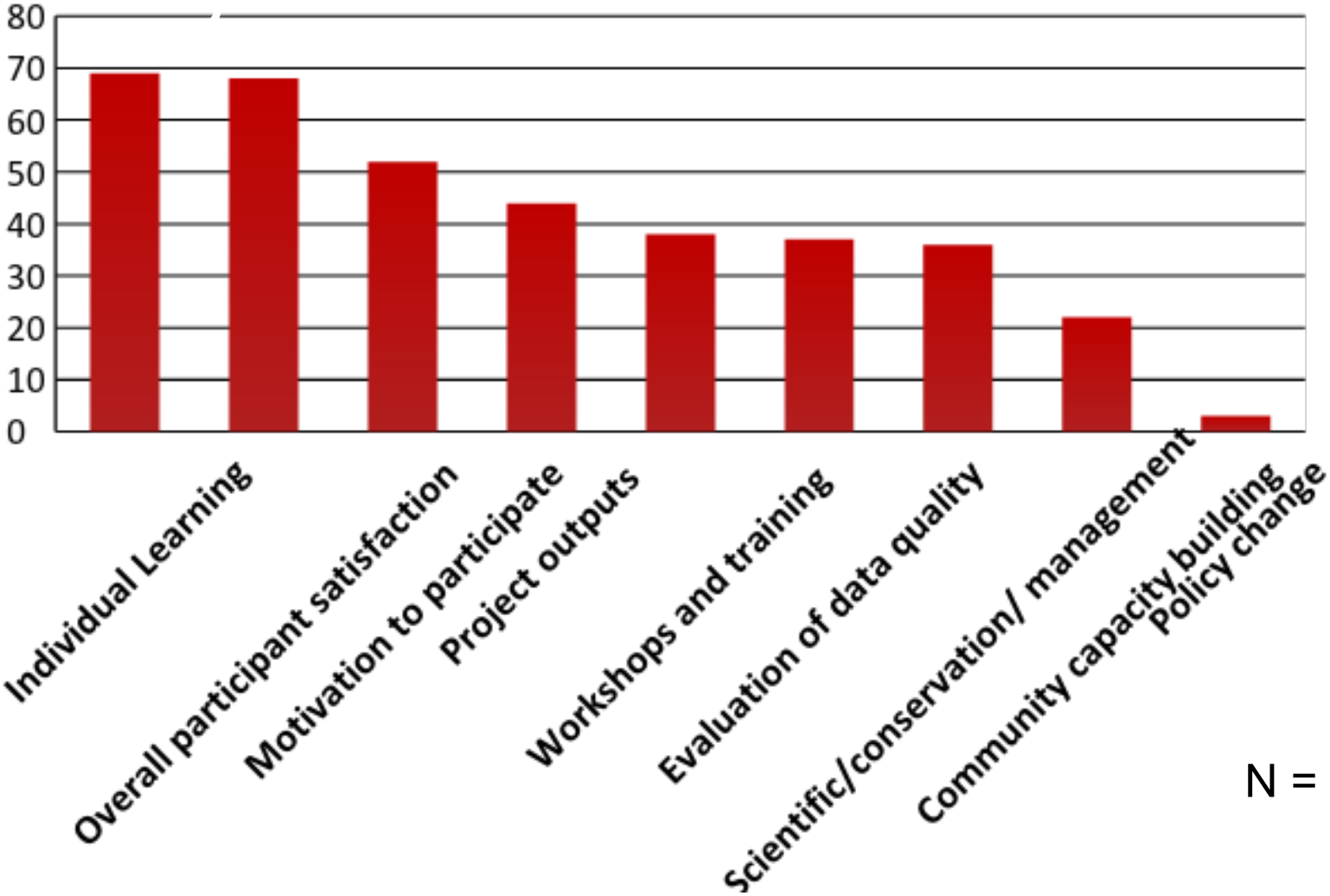
Evaluation is .

the systematic collection of data
to determine strengths and weaknesses
of programs, policy, products, so as to
improve their overall effectiveness.

Needs Assessment

Stated Goals of Citizen Science

Outcomes Evaluated across Projects



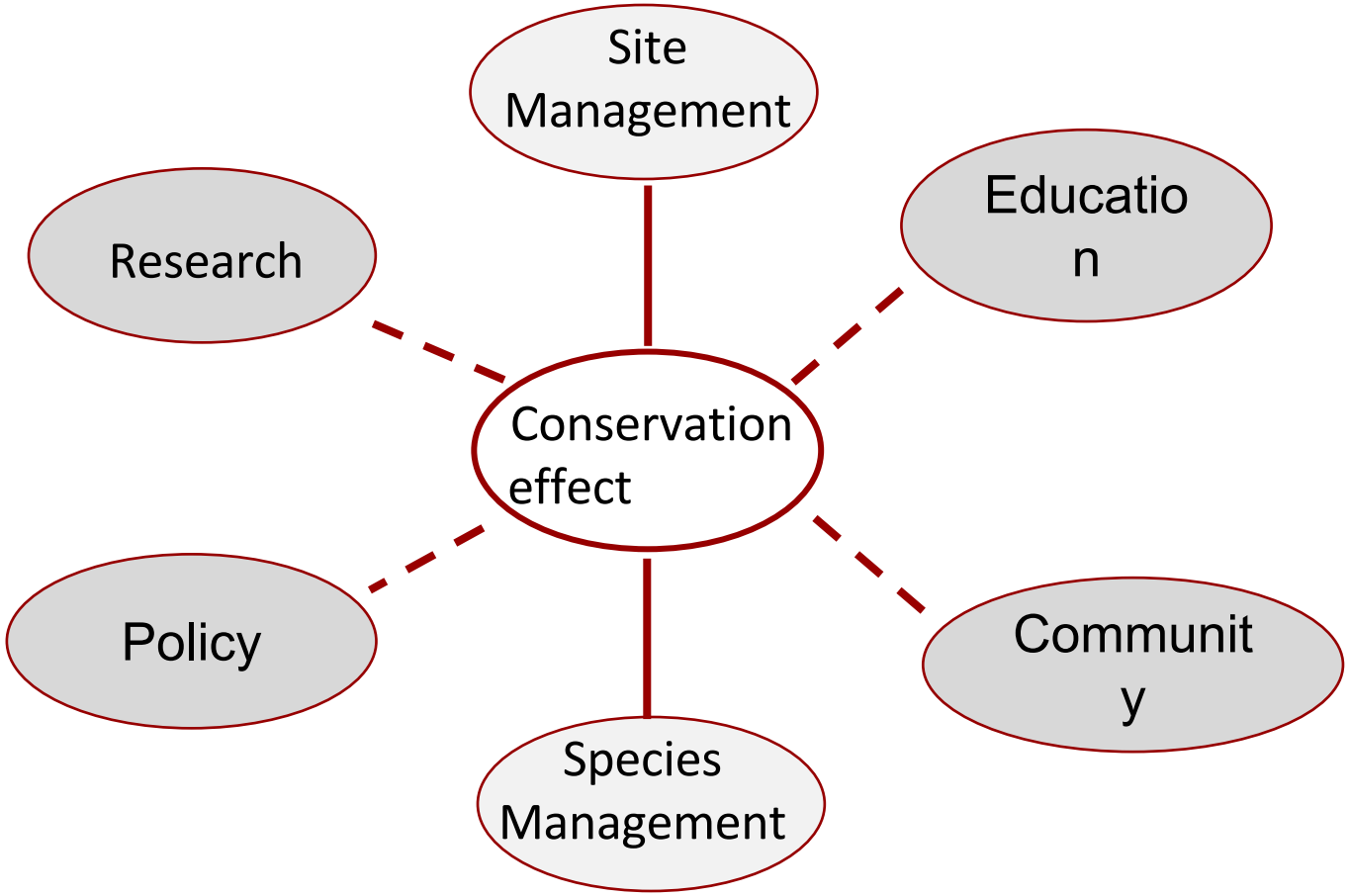
N = 200

Fundamental Questions

- **What should our conservation goals be and how do we measure progress in reaching them?**
- How can we most effectively take action to achieve conservation?
- How can we do conservation better?

Salafsky et al. 2002, Conservation Biology

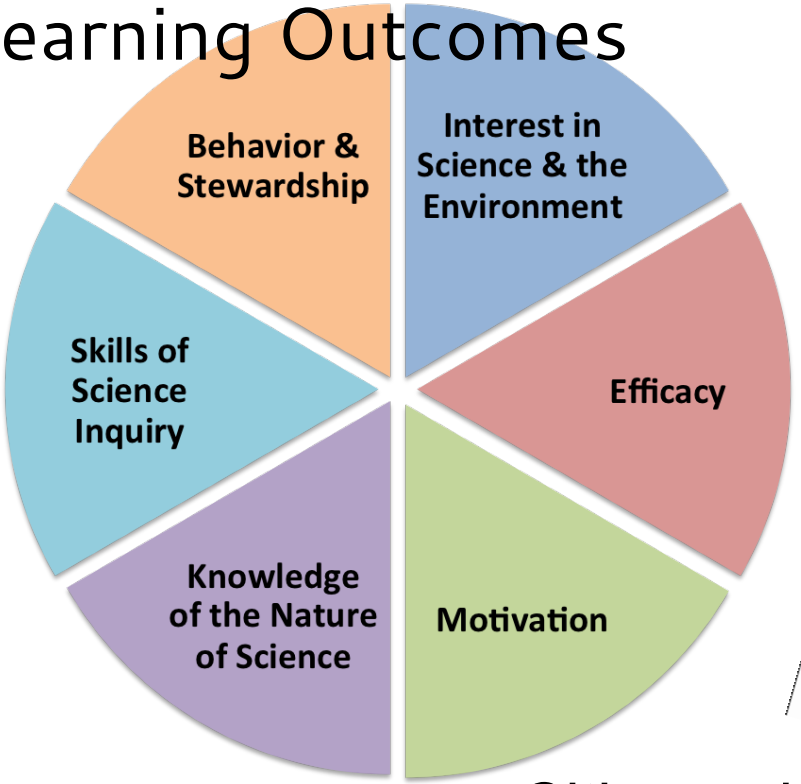
Evaluation of Conservation Activities



Adapted from Kapos et al. 2008

Educational

Framework for Evaluating Learning Outcomes



Citizenscience.org

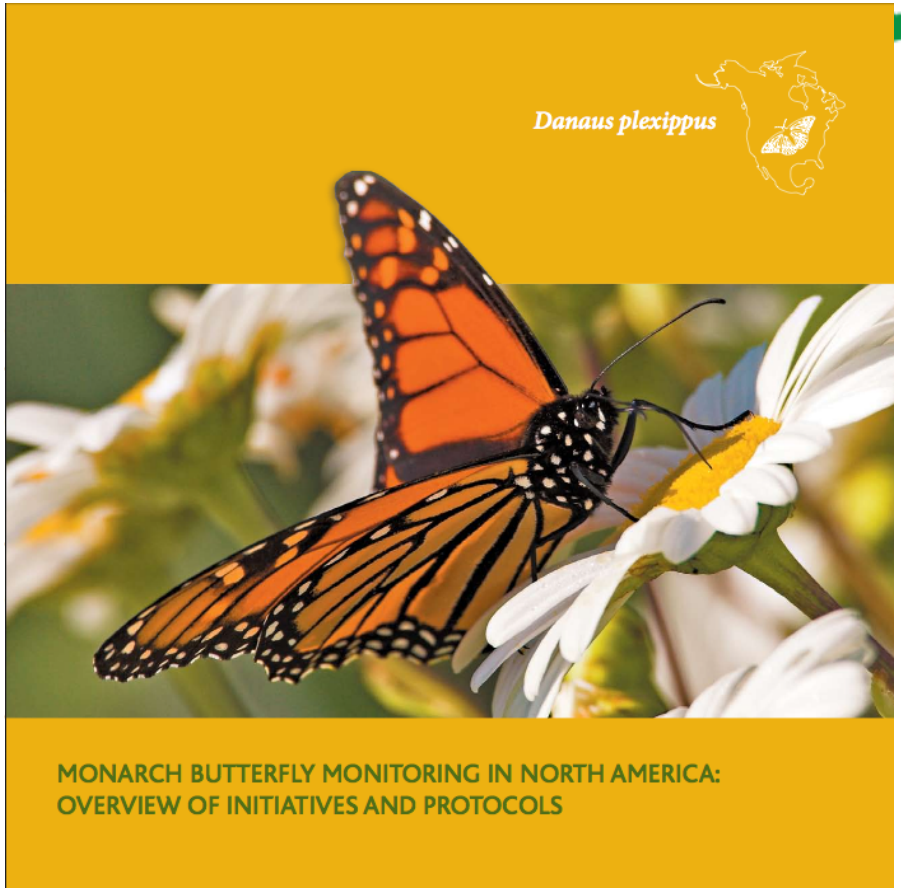
DEVISE

- Interest in Science and Nature (adult version)
- Interest in Science and Nature (youth version)
- Nature Relatedness Scale*
- Self-Efficacy for Science*
- Self-Efficacy for Environmental Action*
- Motivation for Science*
- Motivation for Environmental Action*
- Perceptions of Science Scale
- Skills of Science Self-Report*
- Data Interpretation Quiz
- General Environmental Stewardship Scale
- Behavioral Intention Scale*

**customizeable*

Monarch Larva Monitoring

MLMP Volunteers: Advocates for Monarch Conservation



"Lots of stories but not enough time right now. Have to get milkweed seeds ready to give away at Purdue's Bug Bowl."

Since being involved in the MLMP, volunteers have protected their monarch sites by placing land in preserves, easements, or trusts to ensure it will stay a monarch habitat rather than fall victim to development. Volunteers have also protected monarch habitat by influencing policy makers and land managers to change practices, such as mowing, limiting pesticide and herbicide use, and invasive plant removal.

Results of the survey demonstrated that MLMP volunteers not only contribute to long-term data collection, but they also take direct actions to conserve the monarch butterfly in its larval stage as well as its amazing migration. We're thrilled that MLMP volunteers are becoming active voices for monarchs in their communities!

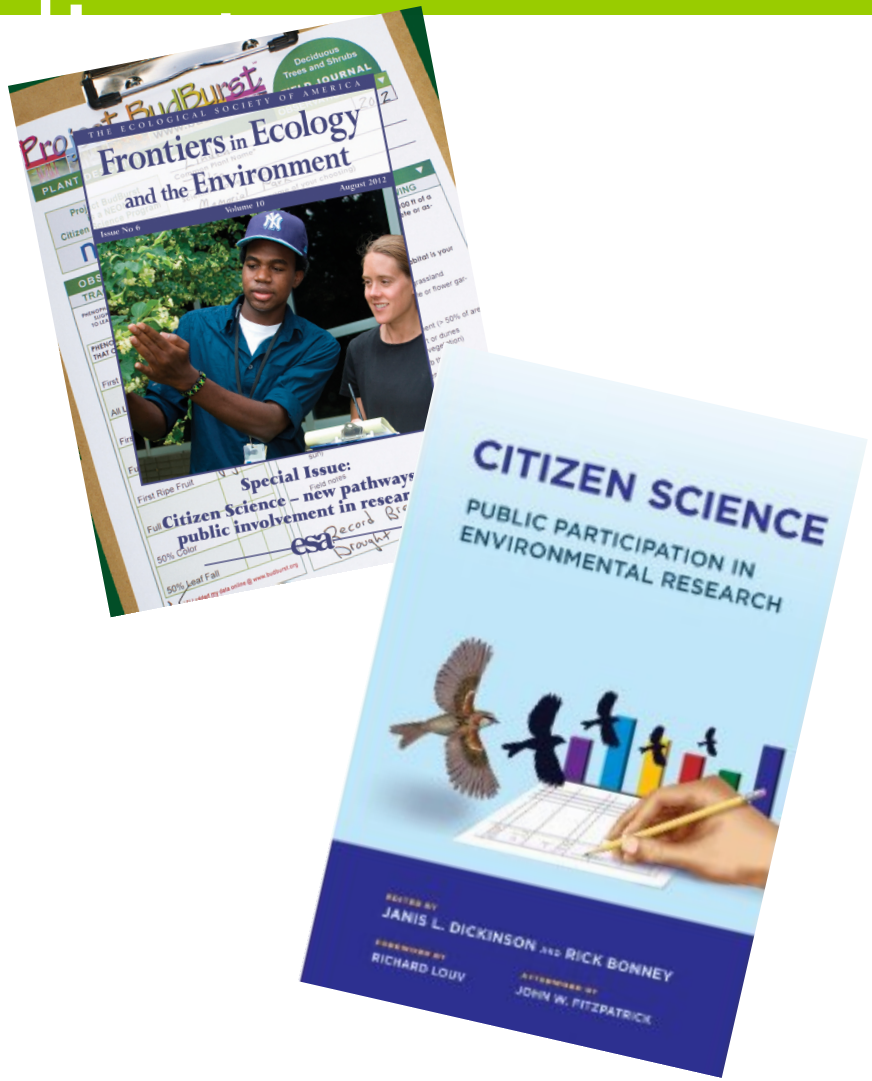
The Great Sunflower Project

Pollinator Habitat Challenge

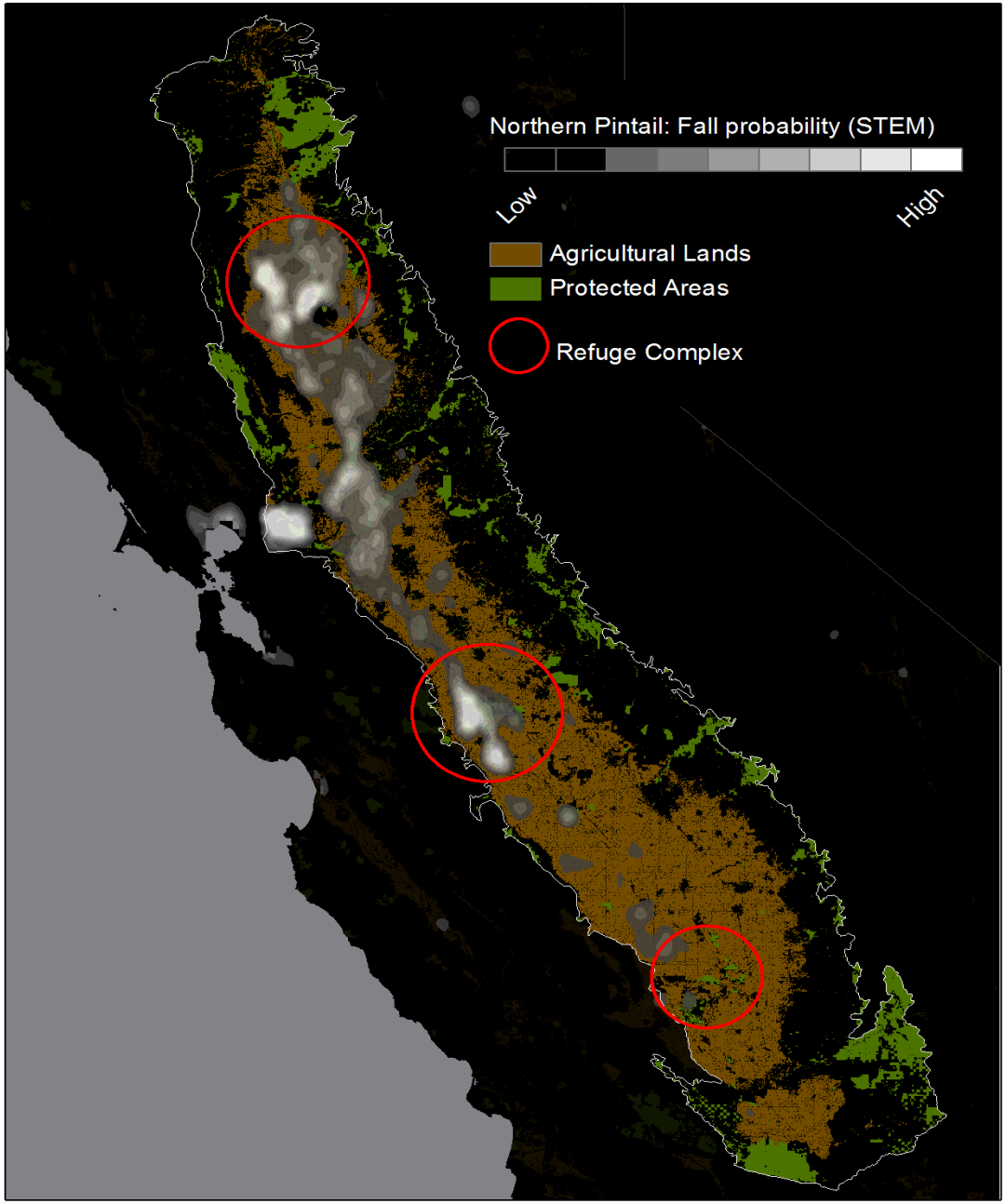
- Habitat Pollinator pilot study pre assessment
- Participants given a “habitat score”
- Habitat Pollinator pilot study post assessment
- Compare data from pre/post habitat assessment
- Do habitat assessments differ pre-post?
- Are more bees reported this year vs. last year?

Research

- Publications
- Evaluation of data quality
- New technologies
- Accessibility and utility of data
- Increased understanding of natural systems
- Data informing management decisions, regulations
- Early detection
- Interdisciplinary collaborations
- Grad students, dissertations



eBird

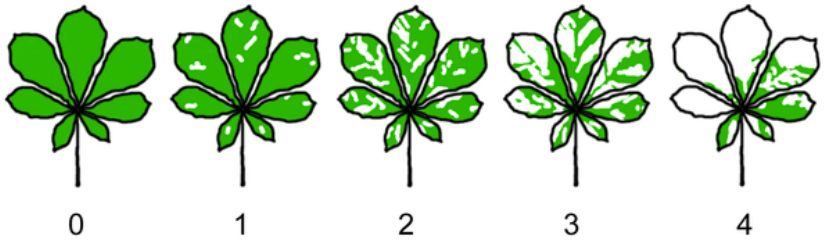


- *140 million observations*
- *Global*
- *99% of all known sp. reported*

Hypothesis-driven project

- Relationship between damage to the trees and length of time the moth (*Cameraria ohridella*) had been in an area.
- Relationship between rate of predation of the leaf-miner by parasitic wasps and time that the moth had been present.
- Participant's data was accurate in all but one case.

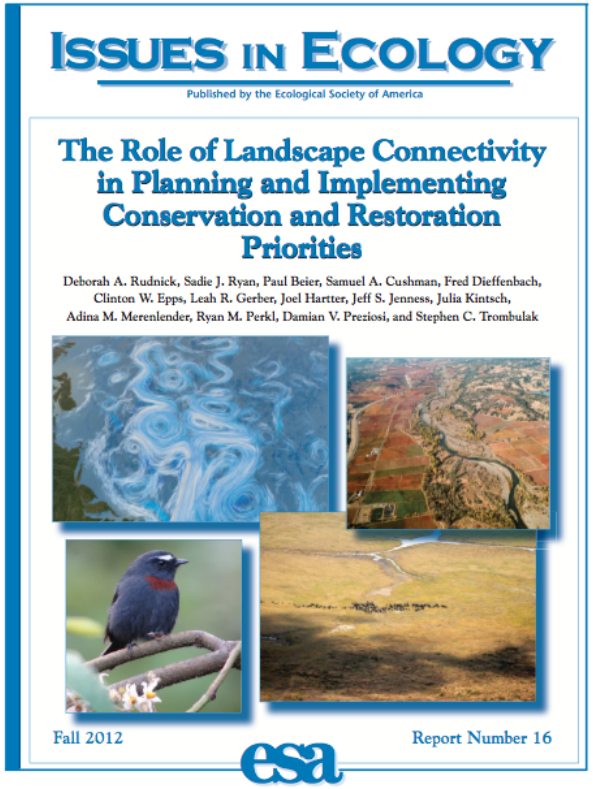
Leaf-miner moth



Pocock MJO, Evans DM (2014) The Success of the Horse-Chestnut Leaf-Miner, Cameraria ohridella, in the UK Revealed with Hypothesis-Led Citizen Science. PLoS ONE 9(1): e86226. doi:10.1371/journal.pone.0086226

Policy Indicators

- Inclusion of local expertise
- Utility of data
- Time to decision
- Local capacity building
- Policies and management plans
- Legislation passed
- Enforcement and adoption of plans, legislation, etc.



Adapted from Danielsen et al. 2008, Conservation Biology

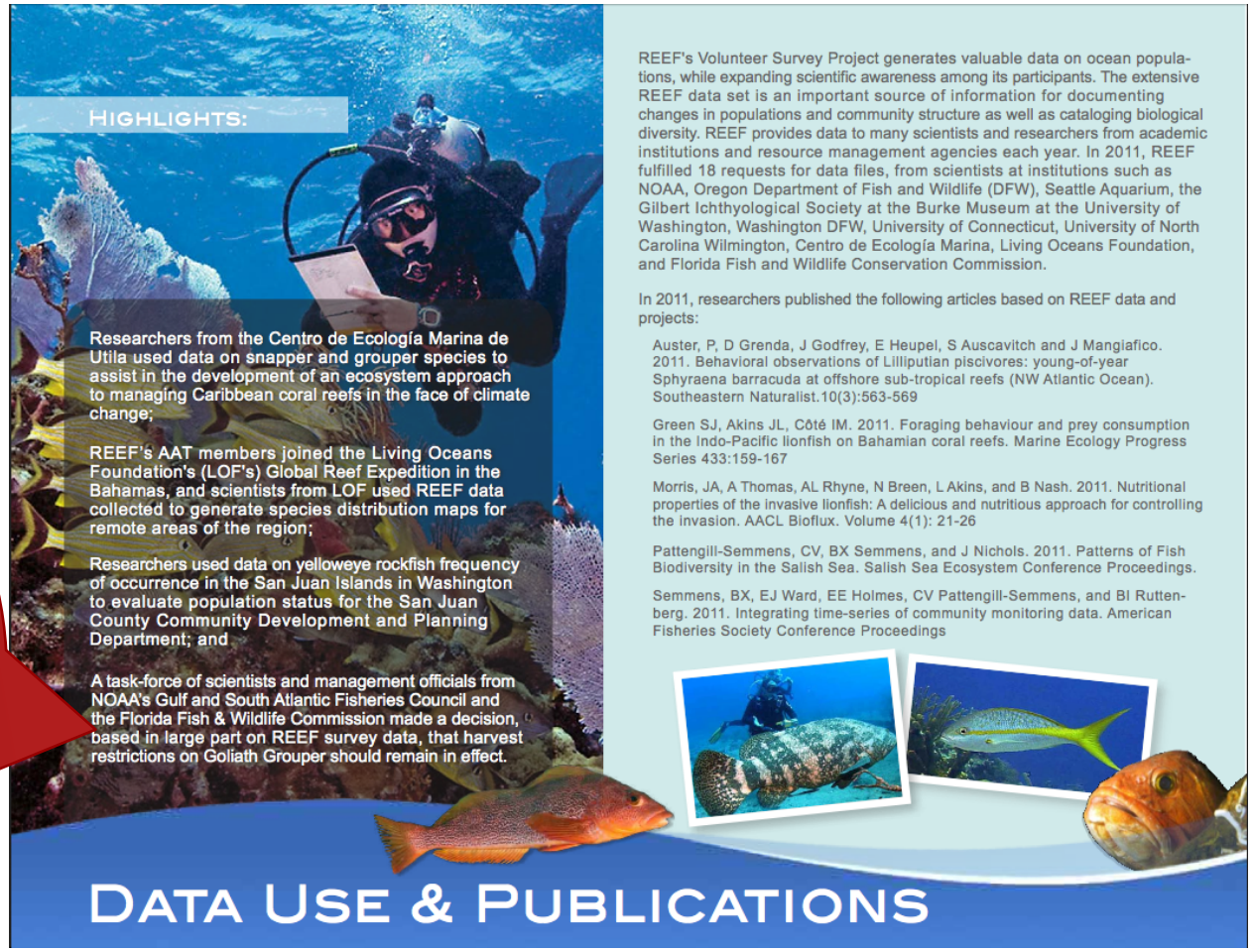
COASST

By collaborating with citizens, natural resource management agencies and environmental organizations, COASST works to translate long-term monitoring into effective marine conservation solutions.

REEF

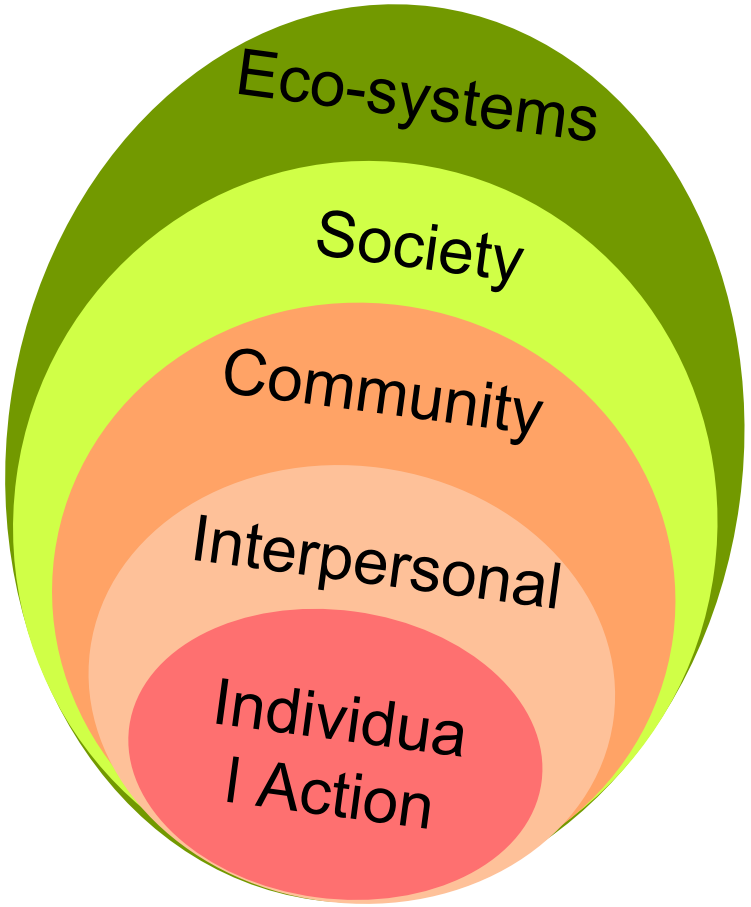
(Reef Environmental Education Foundation)

A task force of scientists and management officials from NOAA's Gulf and South Atlantic Fisheries and the Florida Fish & Game Commission made a decision based in large part on REEF survey data, that harvest restrictions on Goliath Grouper should remain in effect.



Community-based

- Community buy-in and support
- Social capital
- Economic impacts
- Environmental justice
- Increased trust
- Co-adaptive management
- Disaster and conflict resiliency



Celebrate Urban Birds

Sea turtle conservation

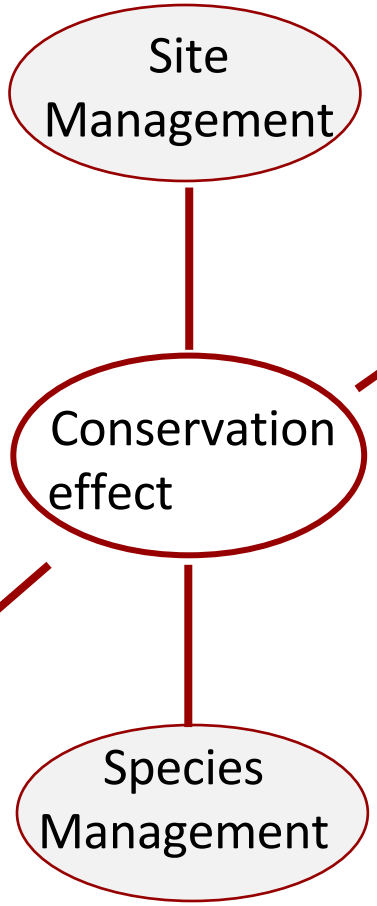
GRUPO TORTUGUERO
DE LAS CALIFORNIAS

Fundamental Questions

- What should our conservation goals be and how do we measure progress in reaching them?
- **How can we most effectively take action to achieve conservation?**
- How can we do conservation better?

Salafsky et al. 2002, Conservation Biology

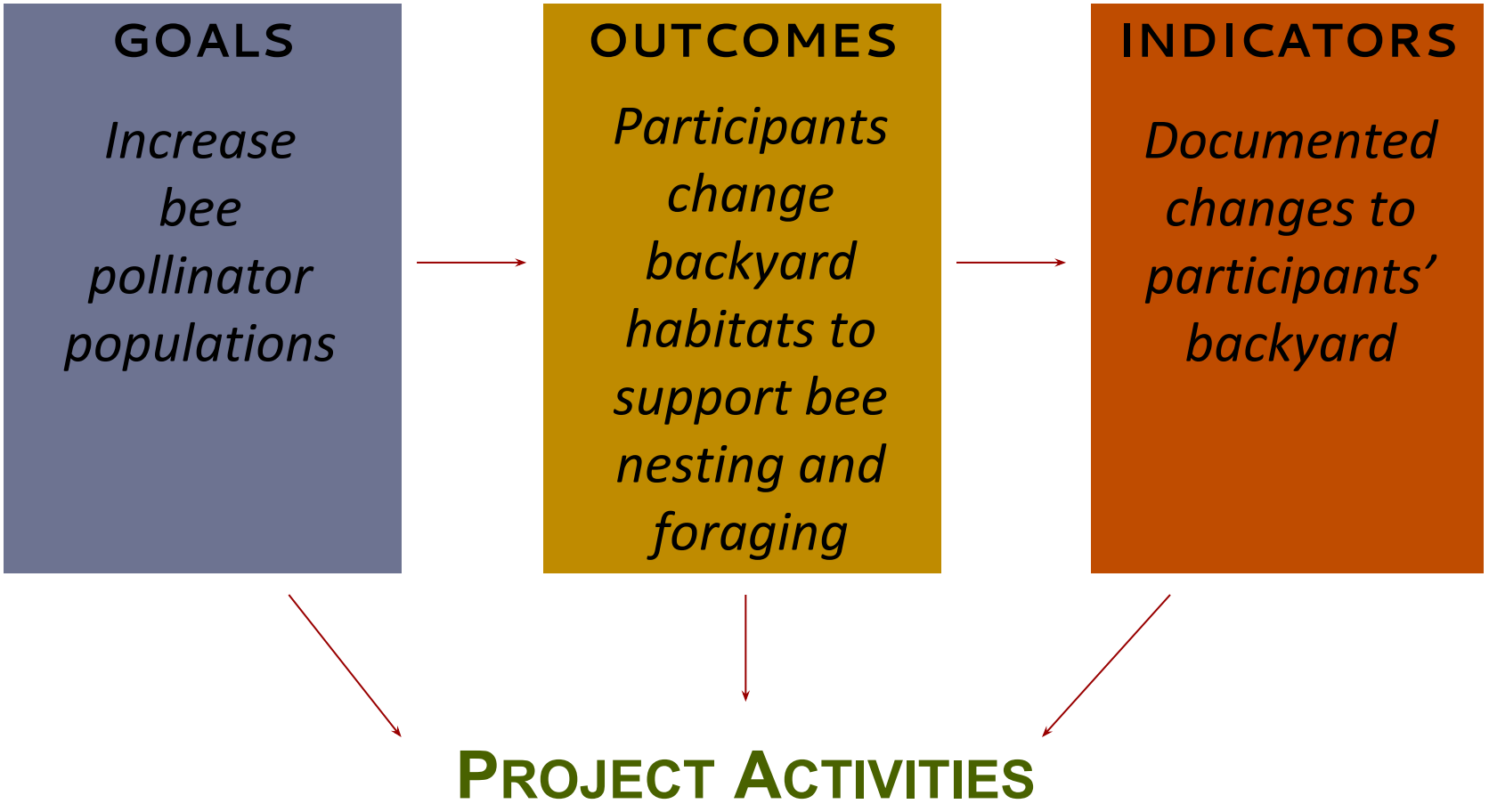
Tap into Motivations



SENSE OF PLACE

Concern for species

Goals, Outcomes, &



Articulate Program

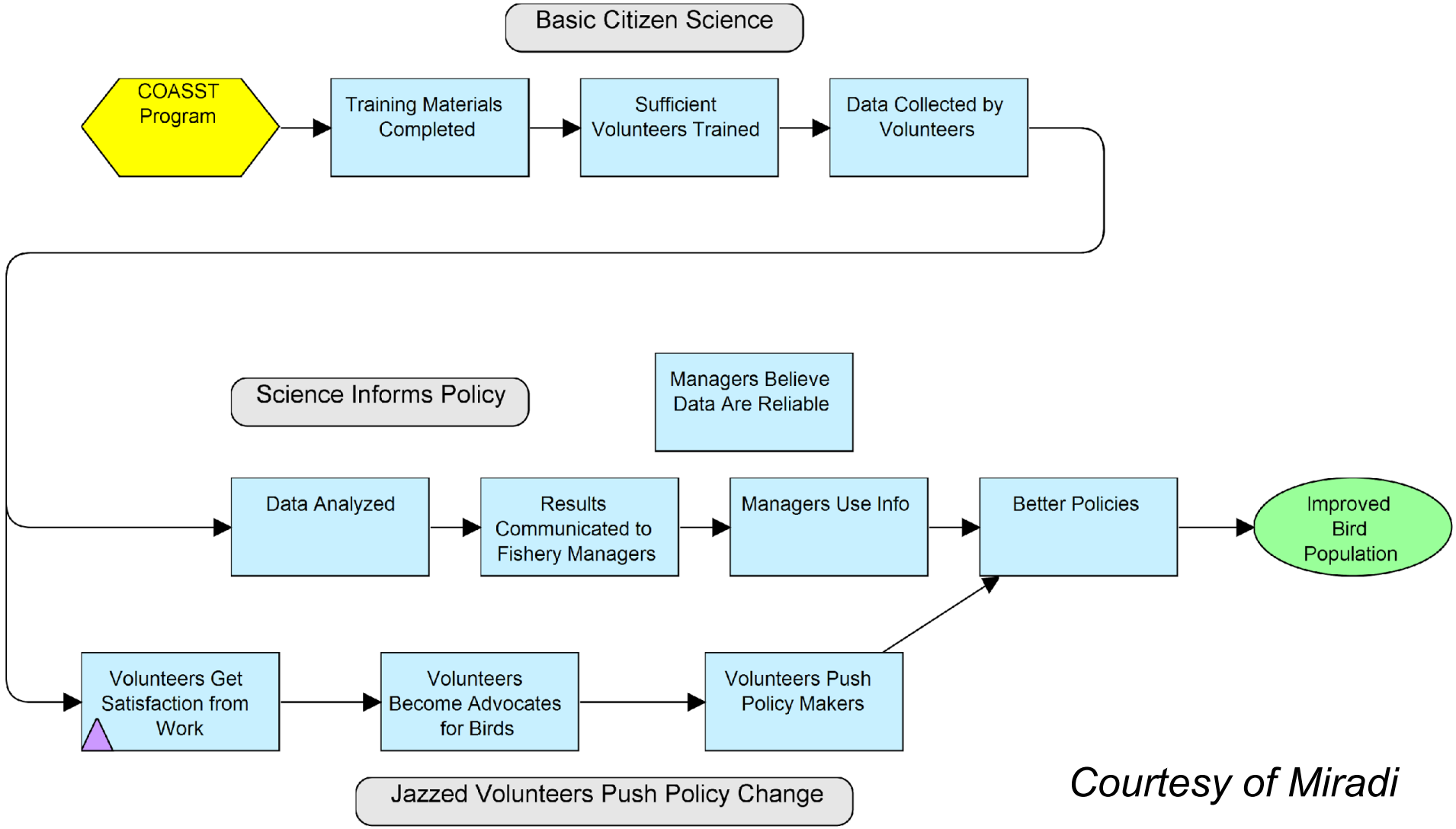
Inputs	Activities	Outputs	Outcomes	Impacts
- Project team - Materials - Infrastructure - Partners - Funding	- Learn protocol - Observe - Collect data - Submit data -Communicate with others - Explore data	- Publicly accessible data - Data visualization tools - Volunteer effort/hours - Exposure to science	- Increased capacity for youth dev. - Expanded community network & learning opps - Increased knowledge of best practices	- Increased social capital - Improved relationships with science orgs/NGOs - Improved habitat for birds

Testing Assumptions >> Results

"A results chain is a tool that shows how a project team believes a particular **action** it takes will lead to some desired **result**. More specifically, for conservation projects, a results chain represents a team's **assumptions** about how project or program **strategies** will contribute to reducing important threats, **leading to the conservation** of priority targets."

-- Foundations of Success

Results Chain



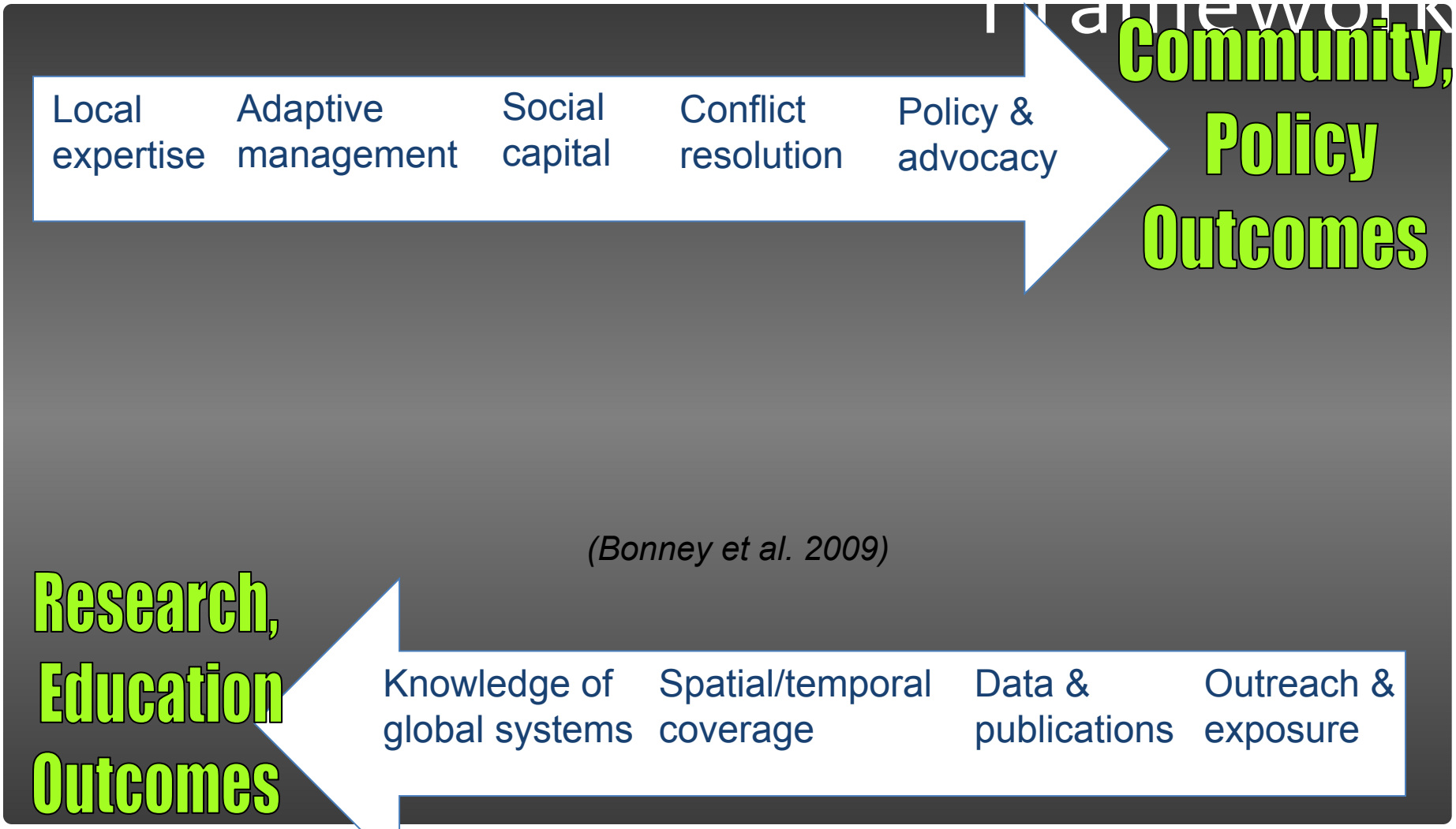
Courtesy of Miradi

Fundamental Questions

- What should our conservation goals be and how do we measure progress in reaching them?
- How can we most effectively take action to achieve conservation?
- **How can we do conservation better?**

Salafsky et al. 2002, Conservation Biology

Strengths Analysis Framework



Planning for Success

Adaptive management cycle

- Build evaluation into program design
- Align goals – outcomes – activities
- Identify measureable indicators
- Measure change at multiple points in time
- Work with social scientists/evaluators
- Invest in capacity to evaluate what is important, not just urgent
- **Document! Document! Document!**

Margoluis et al. 2009, Bliss 2001

Thank you!

tina.phillips@cornell.edu